Glossary of Terms

absolute pressure**?** (cf gage pressure) the sum of atmospheric pressure plus the pressure due to the height of water above the measuring location.

air-line**?** device used to measure water levels in wells. Consists of a tube extending to a known depth in the well. Air pressure required to force water out of the tube is measured and converted to depth of water above the bottom of the tube.

anisotropy**?** condition in which the magnitude of a physical characteristic varies with direction (e.g., hydraulic conductivity).

aquifer**?** a formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.

aquitard**?** see confining unit.

artesian aquifer**?** see confined aquifer.

available drawdown**?** for a pumping well, the distance from static water level to approximately 5 feet to 10 feet above the pump intake.

barometric efficiency**?** ratio of changes in water level in well to the change in atmospheric pressure in consistent units.

boundary effects**?** influences on groundwater flow within an aquifer due to hydraulic features in hydraulic connection with the aquifer, e.g., rivers, lakes, faults, leaky confining units, etc. Boundary effects may increase or decrease the amount of drawdown that would occur if the aquifer were of infinite areal extent.

casing storage effect**?** deviation from the predicted time-drawdown curve in an observation well caused by pumping of water from storage in the well casing. The result is understressing of the aquifer early in the pumping phase. This effect usually dissipates within the first few minutes of the test.

cone of depression**?** an area of lowered head centered on a pumping well.

confined aquifer**?** (artesian aquifer) an aquifer in which the water levels in wells stand above the top of the aquifer, and that, when pumped, receives no recharge from or through the confining layers above or below the aquifer.

confining unit**?** a unit that has significantly lower ability to transmit water than the aquifers that it separates.

delayed gravity response**?** a characteristic of unconfined aquifers, the rate of drawdown in response to pumping declines temporarily due to draining of the dewatered part of the aquifer under the influence of gravity.

drawdown**?** reduction in head in response to pumping, the difference between static water level and the water level at a given time during the pumping phase of a pumping test.

elastic response**?** release of water from storage in an aquifer as the aquifer material compresses and the water expands due to lowering of pressure as a well is pumped.

flowing well**?** a well completed in a confined aquifer at a point where the head is at a higher elevation than the top of the well casing.

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full penetration? condition in which a well is screened over the entire saturated thickness of an aquifer.

gage pressure? (cf absolute pressure) pressure in excess of atmospheric pressure.

hydraulic conductivity? the volume of water at the existing viscosity that will move in unit time under a unit hydraulic gradient through a unit area of aquifer measured at right angles to the direction of flow.

hydraulic gradient? the difference in hydraulic head between two measuring points divided by the distance between the measuring points.

hydraulic head? the level to which water in a well would rise measured relative to a datum, commonly sea level.

interference effects? changes in water levels caused by changes of stress on the aquifer other than pumping well designated for an aquifer test. Interference effects can arise from cycling of pumps in other wells, changes in barometric pressure, changes in river stage or lake level, tides, etc.

leaky-confined aquifer? an aquifer in which the water levels in wells stand above the top of the aquifer and that, when pumped, receives discharge from a bounding confining layer or from another aquifer through the intervening confining layer.

orifice tube? device used to measure flow rate. Consists of a pipe with a smaller-diameter, circular opening and a piezometer on the pipe centerline. The pressure in the pipe, measured as height of water in the piezometer, is converted to flow rate using charts such as Attachment 7.

partial penetration? condition in which a well is screened over part of the saturated thickness of an aquifer.

permeability? term commonly used as synonymous with hydraulic conductivity. However, the term intrinsic permeability refers to the proportionality constant relating discharge to fluid characteristics and hydraulic gradient (Freeze and Cherry, 1979, p. 27).

residual drawdown? the difference between static water level and the water level at a given time during the recovery phase of a pumping test.

saturated thickness? distance between the top and bottom of an aquifer.

specific capacity? ratio of pumping rate of a well divided by the drawdown measured in the well after the water level has stabilized.

specific retention? ratio of the volume of water retained against the force of gravity in a porous material to the volume of material, due to capillary action.

specific storage? the volume of water a confined aquifer releases from or takes into storage per unit surface area of aquifer per unit change in head (storage coefficient) divided by the saturated thickness.

specific yield? the ratio of (1) the volume of water that saturated porous material under water table conditions will yield by gravity to (2) the volume of the saturated material.

steady-state stage? the later part of a pumping test, during which the rate of drawdown becomes negligible.

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Notations Used In Text

b? saturated thickness

h? hydraulic head

K? hydraulic conductivity

Q? pumping rate

Q/s? specific capacity of a pumping well

r? radius from pumping well to observation well

s? drawdown

S? storage term (either storage coefficient for confined aquifers or specific yield for unconfined aquifers)

S_s? specific storage

S_c? storage coefficient, storage term for a confined aquifer

S_y? specific yield, storage term for an unconfined aquifer

T? transmissivity

t? time

u? dimensionless argument of the well function (W(u))

W(u)? the Theis well function